

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
22 March 2001 (22.03.2001)

PCT

(10) International Publication Number
WO 01/20489 A1

(51) International Patent Classification⁷: G06F 17/30, H04N 5/765, 7/18, 5/77

(21) International Application Number: PCT/AU00/01103

(22) International Filing Date:
18 September 2000 (18.09.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/154,206 16 September 1999 (16.09.1999) US

(71) Applicants and

(72) Inventors: NICHOLSON, Vincent, J. [AU/AU];
40 Shellcove Road, Neutral Bay, NSW 2089 (AU).
NICHOLSON, Matthew, D. [AU/AU]; 40 Shellcove
Road, Neutral Bay, NSW 2089 (AU).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

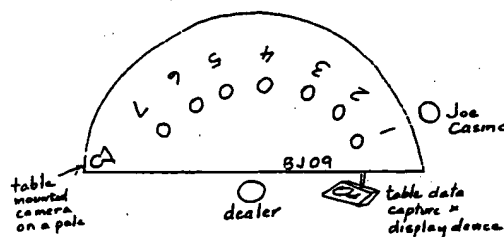
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— With international search report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CASINO TABLE AUTOMATIC VIDEO STRATEGIC EVENT ANNOTATION AND RETRIEVAL



(57) Abstract: A system for the automatic capture, annotation and indexing by strategic event, storage, retrieval and display of annotated video of all strategic events occurring at a gaming table or in a gaming pit or cage window area of a casino. Strategic events used to annotate and index the video include cash/voucher drop, tray count, headcount, hand/spin count, start player rating, end player rating, pause player rating, resume player rating, move player, table opener, table closer, fill, credit, dispute occurrence, pit staff login, pit staff logoff, change in player average bet, change in table minimum bet, request for security assistance, requests for new card deck, etc. The strategic event capture can be automatic or by manual entry. Retrieval of the information can be in video motion or still format with superimposed simultaneous strategic event data annotation and can be recalled by defining the event or entry of various identification parameters such as time, dollar value of transaction, type of event, player ID, dealer ID etc. The system will typically comprise a casino database that captures and stores information (e.g., player identification, financial information, staff information, table accounting information, video surveillance images), table/cage/ceiling/general surveillance video cameras linked to computerized storage, individual table player/pit staff display units, pit staff display and capture units the strategic event details, and a communications network interface to the casino surveillance system which will automatically and simultaneously record and annotate all gaming transaction information. The system can accommodate a duality of display information at one time to enable retrieval of video images while at the same time allowing continued multi-media operation of the pit, table or cage window area.

WO 01/20489 A1

CASINO TABLE AUTOMATIC VIDEO STRATEGIC EVENT ANNOTATION AND RETRIEVAL

In recent years the number of table games utilizing cards, chips, dice etc within casinos has increased markedly. The number of players at any one game, a dealer has to control/monitor is increasing along with a multiplicity of concurrent dealer/player transactions, events, accounting activities and marketing data collection.

Casino surveillance systems are presently limited in the information they can store, recall and transmit. Traditionally, surveillance is not directed to the individual transactions that occur at a gaming table or cage window. Moreover, the increasing complexity of gaming and accounting transactions, rules, legislative and procedural restrictions and loss containment procedures has led to the need for event driven data recall in all gaming areas of the casino as well as the cage window area. The need for increased visual surveillance and retrieval of data at the pit level provides evidence based recall in dispute resolution, allows for analysis of dealer behavior and gaming safeguards, provides marketing information to the casino towards player needs and gaming habits, allows for detailed evaluation of all transactions at any point or place in time throughout the casino, in a effort to maintain the integrity of the game and comply with casino control authority regulations and provides security surveillance of all activities carried on at the casino.

Most casinos have a surveillance system consisting of cameras located in the ceiling which transmit video to a central surveillance centre, where operators can display video from selected cameras on display monitors. The video from key cameras is usually recorded on analog video tapes. When a dispute arises between players or between players and pit staff, recorded video tapes can be examined to determine the actual sequence of events. The tapes can also be examined if the casino regulation authority or police suspect illegal activity has taken place.

While this kind of surveillance system has been widely accepted, it has some major drawbacks. Firstly, an operator has to be observing the video from the right camera to observe a strategic event. This will not always be the case as a large casino could have thousands of cameras but only a handful of surveillance operators. This invention automatically switches the video from the camera recording pre-selected events to the surveillance operator's monitor.

Secondly, even when the operator is observing the video from the camera recording a strategic event, he has to use other methods, or his own memory, to identify the player and pit staff involved and to know the nature and details of the strategic event.

This invention annotates the video with details of the strategic event, eg player ID, staff ID, dollar value of transaction, nature of transaction, table location, etc, providing immediate real-time text information to the operator.

Thirdly, even when the operator is observing the video from a ceiling camera recording a strategic event, his view of the detailed activity on the table, eg card, dice, cash or chip value, may be limited by distance or blocked by players. This invention allows for a camera or cameras to be mounted directly on the table with a clear view of all activities on the table itself.

Fourthly, when video taped recordings need to be examined to determine events or identify a person or persons, hundreds or thousands of hours of recordings have to be examined by an operator in a tedious continuous viewing of the tape to locate the events of interest. This invention allows for the direct and rapid retrieval of only those segments of the video recording which relate to the event or events of interest, markedly reducing the operator video examination time and reducing the risk of an operator missing a key piece of video evidence.

Fifthly, each of the analog tape recorders has to have the tape removed periodically, depending on the tape maximum recording time, and replaced by a new tape. Then the removed tape (holding the recorded video) has to be indexed and stored. This is a very labour intensive activity. Recently analog video recording tape has begun to be replaced by digital recording devices reducing some of these problems.

This invention provides timely and annotated video information which allows for the provision of security on a table by table basis, discourages the potential for player/dealer collusion, allows for the correction of errors due to dealer fatigue, stress and continuous transactional acuity, protects the interests of the casino by the provision of video evidenced based recall of information and allows regulatory authorities and police to investigate any suspicious activity.

Accordingly, it is an object of the invention to provide apparatus for the automatic and simultaneous video monitoring of casino transactions at any table or pit or cage window in the casino, coupled with text annotation to match and clarify the visual image. Annotation and indexation of strategic events is governed by selected activities such as tray count, drop, player fill or credit, table opener/closer, staff log on or log off, etc.

An additional object of the invention is to allow the simultaneous monitoring of all gaming activities at the same time as allowing for the continued provision of gaming/player functions at the table, pit or cage window.

TYPICAL OPERATION OF THE INVENTION³

To explain the operation of the invention, a typical sequence of events is described below.

A player commences gaming at a gaming table and identifies himself verbally or by passing his casino club card to the pit staff.

The pit staff record the commencement of play by swiping the player's casino club card on a data capture device at the table or elsewhere or manually entering the player ID into the casino management system.

As the start of any player's gaming activity is designated as a strategic event, the ID of the player, the location of the table, the position at the table occupied by the player, etc is annotated in text onto the video .

If the start of a player's gaming activity, eg in the case of an excluded player or a player suspected of using illegal methods, is on the list of pre selected strategic events, the video from the ceiling and / or table camera(s) recording the strategic event is displayed on the surveillance operator's monitor along with the strategic event text annotation.

The same video may also be displayed on a large screen for the whole surveillance department to view along with the strategic event text annotation.

The video with the strategic event text annotation may be displayed anywhere in the casino that the communications network provides access to the video, eg in the pit, in the casino shift manager's office, in administration, in marketing, in security, in regulatory offices, etc.

The preferred implementation is with table based display units but display can occur anywhere the casino communications network gives access to the video storage. Display at the table can be a powerful tool in the resolution of disputes and may even discourage the occurrence of disputes. Display at the table can be achieved in either of two approaches. Firstly, the table data capture device can display the video to be viewed by pit staff and even by the player when appropriate by turning the display towards the player. Secondly, a second display unit can be mounted permanently on the table facing the direction of the players. This second approach also allows the display of marketing, learn-to-play the game and other information when not needed to display video for dispute resolution. Periodically displaying segments of the real-time video as it is recorded by the table or ceiling cameras can also remind players of the existence of pervasive surveillance and discourage illegal activity and disputes.

The cameras on the table and in the ceiling record video of the transaction, possibly into separate table camera storage and ceiling camera storage systems, eg ceiling cameras into analog tape recording units (VCRs) because this is the surveillance technology generally in use in casinos at present, table camera video into digital storage units as these cameras will mainly be installed in the era of digital recording technology. Regardless of the recording technology used, the strategic event text annotation is written onto the video storage and is used as indexing information for later retrieval of the video.

At some later date, for security, training, marketing or other reasons, the casino may wish to review video segments with strategic event text annotation relating to specific strategic events. The specific strategic events could be the start of gaming activity of all players who started gaming activity on any table in pit 9 between the hours of 8am and 11am during September 1999. By entering these parameters, the casino is able to rapidly and accurately retrieve the video segments and strategic event text annotations.

SUMMARY OF THE INVENTION

The invention is a system for the improved surveillance of table game and cage window areas of a casino that automatically:

1. captures video from cameras mounted in the ceiling, on the gaming table or in the cage window area;
2. alerts the appropriate surveillance operator that a pre selected type of strategic event has occurred;
3. displays the video from the camera recording the strategic event on the surveillance operator's monitor;
4. displays, on the video, text annotation of the details of the strategic event captured by the casino management system or table player tracking and table accounting systems;
5. indexes the segment of video according to the strategic event;
6. stores the video including the strategic event text annotation;
7. allows retrieval of the relevant video segment or still picture with text annotation of the strategic event by entry of parameters of the strategic event.

CLAIMS

1. An automatic system for annotating video records with text of strategic casino table game player related events for use in a gaming establishment, comprising:
 - a distributed video database which stores the video of table activity for each table having a camera on a computer at that table;
 - a casino player database that stores betting summary records for each of a plurality of players;
 - a communications network;
 - one or more gaming tables, each having one or more video cameras communicating video of the table activity to the video database on the computer on the table;
 - a table player data capture system capturing the time and nature of table game player strategic events and communicating them to the casino player database via the communications network; and
 - a retrieval and display unit on each table, having one or more cameras and a computer, that retrieves from the table computer video database and the casino player database and displays a sequence of current or historical video with text annotation of the player identification and the strategic event occurring at that current or historical time.
2. The system of claim 1 wherein the distributed video database on computers at the tables is replaced by a casino video database.
3. The system of claim 1 wherein the cameras on the tables are replaced by cameras in the casino ceiling and elsewhere.
4. The system of claim 1 wherein the retrieval and display units on the tables are replaced by retrieval and display units located anywhere accessible to the communications network.
5. The system of claim 2 wherein the cameras on the tables are replaced by cameras in the casino ceiling and elsewhere.
6. The system of claim 5 wherein the retrieval and display units on the tables are replaced by retrieval and display units located anywhere accessible to the communications network.
7. An automatic system for annotating video records with text of strategic management events at a casino table game for use in a gaming establishment,

comprising:

a distributed video database which stores the video of table activity for each table having a camera on a computer at that table

a casino cage accounting database that stores cash/chip/credit table accounting information a communications network;

one or more gaming tables, each having one or more video cameras communicating video of the table activity to the video database on the computer on the table;

a table cash/chip/credit transaction data capture system capturing the time and nature of table game cash/chip/credit strategic events and communicating them to the casino cage accounting database via the communications network; and a retrieval and display unit on each table, having one or more cameras and a computer, that retrieves from the table computer video database and the casino cage accounting database and displays a sequence of current or historical video with text annotation of the player identification and the strategic event occurring at that current or historical time.

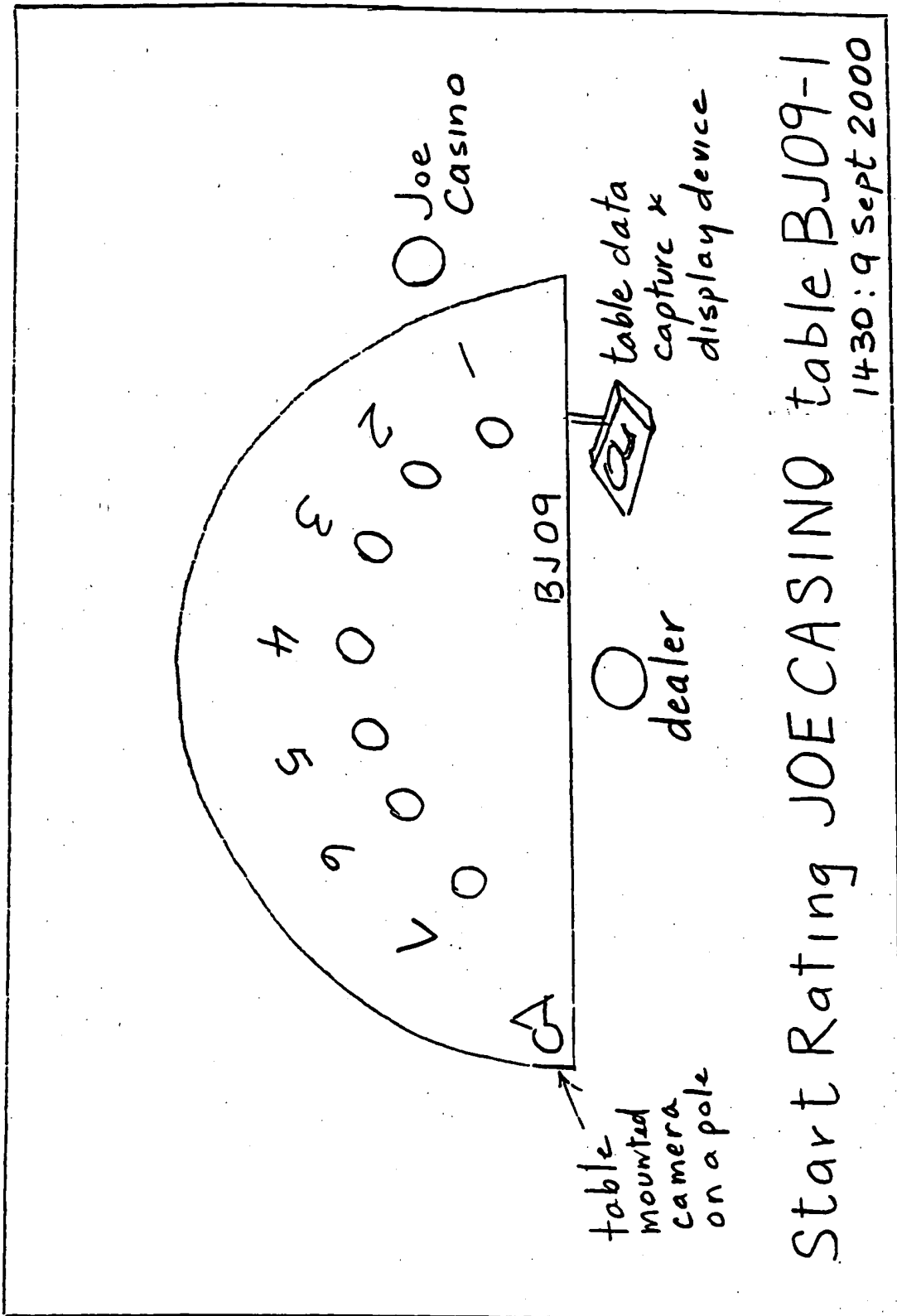
8. The system of claim 7 wherein the distributed video database on computers at the tables is replaced by a casino video database.
9. The system of claim 7 wherein the cameras on the tables are replaced by cameras in the casino and elsewhere.
10. The system of claim 7 wherein the retrieval and display units on the tables are replaced by retrieval and display units located anywhere accessible to the communications network.
11. The system of claim 8 wherein the cameras on the tables are replaced by cameras in the casino ceiling and elsewhere.
12. The system of claim 11 wherein the retrieval and display units on the tables are replaced by retrieval and display units located anywhere accessible to the communications network.
13. An automatic system for annotating video records with text of strategic casino player chip/cash/credit transactions at a casino cage window for use in a gaming establishment, comprising:
 - a casino video database that stores video of the player and the chip/cash/credit transaction activity;
 - a casino player database that stores betting summary records for each of a plurality of players;

a communications network;

one or more cage windows having a video camera communicating video of the player and the chip/cash/credit transaction via the communications network to the casino video database;

a cage window data capture system capturing the time and nature of player strategic events and communicating them to the casino player database via the communications network; and

one or more retrieval and display units that retrieve from the casino video database and the casino player database and display a sequence of current or historical video with text annotation of the player identification and the strategic event occurring at that current or historical time.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU00/01103

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl. ⁷ : G06F 17/30; H04N 5/765, 7/18, 5/77		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) G06F, H04N		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT, IBM		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	WO 99/46702 (SIEMENS CORPORATE RESEARCH, INC) 16 September 1999, please see abstract, page 7 line 15, to page 8 line 6 claim 1	Claim 1,7,13
A	WO 97/40624 (SENSORMATIC ELECTRONICS CORP) 30 October 1997 please see abstract, page 3 line 30 to page 8 line 24	Claims 1-13
A	Patent abstract of Japan 02-204864 A (MATSUSHITA ELECTRIC IND CO) 14 August 1990, please see the abstract	Claim 1
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>		
Date of the actual completion of the international search 31 October 2000		Date of mailing of the international search report - 9 NOV 2000
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929		Authorized officer ROBERT BARTRAM Telephone No : (02) 6283

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU00/01103

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,531,187 (UHLAND) 23 July 1985, please see column 2 lines 38-60, column 3 lines 11-50	Claim 1,7, 13

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU00/01103

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
WO	97/40624	US	19991109
		AU	19971112
		AU	20000928
		BR	19990803
		CA	19971030
		EP	19990303
		EP	20000419
		US	19991109
WO	99/46702	WO	19971030
		NONE	
		NONE	
		NONE	
		NONE	
		NONE	
		NONE	
		NONE	
JP	02_204864A	NONE	
		NONE	
		NONE	
		NONE	
		NONE	
		NONE	
		NONE	
		NONE	
US	4531187	NONE	
		NONE	
		NONE	
		NONE	
		NONE	
		NONE	
		NONE	
		NONE	

END OF ANNEX